EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF TELECOMMUNICATIONS POLICY
WASHINGTON, D.C. 20504

November 24, 1972 OTP CIRCULAR NO. 11

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Frequency Spectrum Policy Concerning the Development and/or Procurement of Communication-Electronics Systems

1. Purpose: The purpose of this Circular is to ensure that availability of frequency spectrum support for Government communication-electronics systems receives a critical review at the national level prior to the expenditure of public funds for such systems. This Circular establishes the policy and certain guidelines in connection with requests for the appropriation of funds for communication-electronics systems which require the use of the frequency spectrum.

2. Background: Pursuant to Reorganization Plan No. 1 of 1970, dated April 20, 1970, Executive Order 11556, dated September 4, 1970, charges the Director of OTP with the review of telecommunications research and development, system improvement and expansion programs, and programs for the testing, operation and use of telecommunications systems by Federal agencies. Among other duties, the Director:

a. Makes recommendations to appropriate agency officials and to the Director of OMB concerning the scope and funding of telecommunications programs;

b. Performs the functions relating to the assignment of radio frequencies to radio stations belonging to and operated by the United States, or to classes thereof, conferred upon the President by Section 305(a) of the Communications Act of 1934, 47 U.S.C. 305(a);

c. Coordinates the telecommunication activities of the executive branch and formulates policies and standards therefor, including consideration of spectrum use; and

d. Conducts and coordinates economic, technical and system analyses of telecommunications policies, activities and opportunities in support of assigned responsibilities.

3. Policy: Executive agencies will ensure that no funds are obligated for either the development or procurement of communication-electronics systems requiring the use of the frequency spectrum until the availability of appropriate spectrum support is assured. This policy does not apply to uses of the spectrum for basic research or experimentation wherein recognition or protection is not required.

4. Agency Actions: Prior to the submission of annual budget estimates to the OMB relating to the appropriation of funds for either the development or procurement of communication-electronics systems as defined in the attachment hereto, executive agencies shall obtain frequency spectrum support for such systems. As an initial step toward implementing the above policy, the specific procedures for obtaining spectrum support are outlined in Part 8.3 of the OTP Manual of Regulations and Procedures for Frequency Management. (attached)

5. OMB/OTP Action: OMB and OTP will coordinate the implementation of the policy and procedures set forth in this Circular.

6. Authority: Executive Order 11556 of September 4, 1970.

7. Effective Date: January 1, 1973.

Clay T. Whitehead
Director

Attachment

8.3 PROCEDURE FOR THE REVIEW OF TELECOMMUNICATION SYSTEMS FOR FREQUENCY AVAILABILITY AND ELECTROMAGNETIC COMPATIBILITY (EMC)

8.3.1 General

Government agencies planning the use of, conducting experiments relating to, or developing and procuring telecommunication systems requiring the use of radio frequencies shall take all reasonable measures to ensure that such systems will neither cause nor receive harmful interference when placed in their operational environments. To assist Government agencies in meeting this responsibility and to support the OTP and the IRAC in the management of radio spectrum resources for the satisfaction of Government requirements, and in the national interest, these procedures provide for the review of new Government telecommunication systems by the Spectrum Planning Subcommittee (SPS), at a number of the stages of their evolution prior to the assignment of frequencies. Such review will, as appropriate, require an examination of the existing systems in the frequency band(s) being considered. Full participation of the FCC in these procedures for the review of Government systems intended for operation in bands of mutual Government/non-Government interest occurs through the normal FCC liaison representation on the IRAC and its subcommittees.

8.3.2 Definitions

A telecommunication system is defined for the purpose of this procedure as a combination of facilities, stations, or circuits intended to perform an information transfer function by the use of the radio spectrum, e.g.:

- o a space station(s) and its associated earth stations for provision of meteorological information;
- o a combination of aeronautical stations for communication support of air traffic control;
- o an interconnected network of fixed stations;
- o a combination of fixed and land mobile stations intended to provide communication support for law enforcement or protection activities on a local or area-wide basis;
- o a combination of facilities intended to provide a radionavigation service, e.g., CAS, ILS, radionavigation satellite; or
- o a combination of facilities intended to provide a radiolocation (radar) service.

A telecommunication subsystem is defined, for the purpose of this procedure, as a combination of facilities, stations, or circuits intended to provide telecommunication support to a broader functional telecommunication entity, e.g., the surveillance portion of an air defense system or the avionics package of a nomenclature aircraft.

An individual radio station, an individual point-to-point radio link, or an individual network in the mobile radio service which is to become a part of an existing identified telecommunication system or subsystem, for example, will normally not be considered for the purpose of this review procedure. Application and plans for such individual stations, radio links, and services will be reviewed by the SPS only upon direct referral for cogent reasons such as given in section 8.3.1.

For the purpose of this procedure a major change is defined as any modification of the technical or operational characteristics of an existing telecommunication system or subsystem having a significant impact on the EMC characteristics of the system/subsystem.

8.3.3 Scope of Procedure

This procedure is applicable to systems and subsystems as defined in Section 8.3.2. Initially it shall be limited to:

a) new telecommunication systems or subsystems, including major modifications thereof, involving the use of satellites or spacecraft which require recognition and/or protection in the use of radio spectrum;

b) new major terrestrial telecommunication systems or subsystems, including major modifications thereof, intended for operation in the following bands: (A major system is one that will have significant impact on the radio frequency resource available taking into account geographic, orbit and spectrum occupancy considerations.)

1427 -1429 MHz	7145 - 7235 MHz
1558.5-1636.5 MHz	7300 - 7750 MHz
1670 -1710 MHz	7900 - 7975 MHz
1750 -1850 MHz	8025 - 8500 MHz
2200 -2300 MHz	14400-14500 MHz
5000 -5250 MHz	15400-15700 MHz
	21200-22000 MHz

c) Such systems or facilities as may be referred to the SPS on a case-by-case basis by the OTP, the IRAC, the FAS, or a cognizant Government agency. Such referral may result from factors of systems cost or importance or follow from estimates of unusual potential impact on other spectrum uses.

It is not intended that experimental projects be necessarily included in the Systems Review Procedure. Specifically exempt would be basic research and experimental uses not requiring protection or IFRB-type recognition. Such uses, by the terms of their authorization, are operated on a no-protection, non-interference basis. Experimental uses are included in this procedure if the experiments look toward the development of an operational system or subsystem.

8.3.4 Stages of Review

New telecommunication systems or subsystems and major changes in the technical characteristics or operational applications of existing systems or subsystems, falling within the scope of this procedure, shall be referred to the SPS for review at each of the following Stages, as appropriate:

Stage 1 - Planning (conceptual) Stage

1. Space Systems All new system concepts shall be reviewed as early as significant system definition data can be made available. This review will normally be conducted four to six years prior to the planned date of initial operation. Such review should be completed not less than one year prior to the initial date of operation.

2. Terrestrial Systems Systems involving new or unconventional concepts and techniques as regards spectrum use, or estimated to have a major impact on spectrum usage as identified by user agencies, OTP or IRAC, shall be reviewed upon completion of concept definition. Normally, this review will be conducted three years prior to the planned date of initial operation.

Stage 2 - Experimental State (new techniques or equipments)

Experimentation involving either space or terrestrial techniques that looks toward the development of a new telecommunication system or subsystem.

Stage 3 - Development Stage

1. Space Systems All new systems and subsystems shall be reviewed or, in appropriate cases, previous reviews shall be updated prior to commencing development actions. Such reviews will normally be initiated a minimum of 18 months prior to commencement of development actions. No frequency assignment action will be effected until reviewing action has been completed.

2. Terrestrial Systems New systems and subsystems as defined in Section 8.3.3, para. b) shall be reviewed

or, in appropriate cases, previous reviews shall be updated prior to commencing development actions. Such reviews will normally be initiated 6 to 18 months prior to commencement of development actions. No frequency assignment action will be effected until reviewing action has been completed.

Stage 4 - Procurement Stage

1. Space Systems All new systems and subsystems shall be reviewed or, in appropriate cases, previous reviews shall be updated prior to commencing procurement actions. Such reviews will normally be initiated a minimum of 18 months prior to the commencement of procurement actions. No frequency assignment action will be effected until reviewing action has been completed.

2. Terrestrial Systems New systems and subsystems as defined in Section 8.3.3, para. b) shall be reviewed or, in appropriate cases, previous reviews shall be updated prior to commencing procurement actions. Such reviews will normally be initiated 6 to 18 months prior to the commencement of procurement actions. No frequency assignment action will be effected until reviewing action has been completed

8.3.5 Responsibilities

The Spectrum Planning Subcommittee (SPS)

In its system review, the SPS shall give consideration to:

a) system compliance with prevailing policy, allocations, regulations, and technical standards (Government, National and International); and

b) the predicted degree of EMC between the proposed system and the electromagnetic environment.

Upon assessment of a proposed system or subsystem against these criteria and any other pertinent factors, the SPS will make recommendations[1] with supporting documentation to the IRAC for:

[1]The SPS may, with the consent of or at the request of the proposing agency, defer recommendations to the IRAC to allow for adjustment of the agency's proposal in response to the assessments of the SPS for enhancement of EMC. The results of any EMC analysis performed in the review process will be provided to the agency and direct consultation arranged between the proposing agency and the agency performing EMC analysis, if desired.

a) approval of spectrum support for the system at its proposed stage of development without qualification;

b) approval of spectrum support subject to stated limitations or to modification of the proposed system;

c) approval of spectrum support subject to limitations, or modifications to systems already in the band; or

d) disapproval of spectrum support.

The SPS shall also review the data furnished by other countries regarding their proposed space telecommunication systems in accordance with Articles 9 and 9A of the ITU Radio Regulations, and estimate the impact of these systems on existing and planned Government space and terrestrial radiocommunication. The SPS will provide recommendations to the IRAC, including proposed replies to the IFRB and to the nations involved.

The Interdepartment Radio Advisory Committee (IRAC)

The IRAC shall, based on the recommendations of the SPS and any other available pertinent information:

a) recommend OTP approval or disapproval of frequency support appropriate to the stage of development of the proposed system; or

b) in cases involving major policy implications, make recommendations to the OTP.

The determinations of the IRAC or the OTP and the basis for these determinations will be provided to the proposing agency, the Chairman of FAS, and to other agencies, as appropriate. These shall be used as a basis for subsequent frequency assignment actions and for submission of information required for international advance publication and coordination under Articles 9 and 9A of the ITU Radio Regulations.

The Frequency Assignment Subcommittee (FAS)

The FAS shall not assign frequencies to stations in systems that are subject to these procedures until notice is received that frequency support for the system has been approved. The particulars of the assignments shall conform to the terms of the system approval. Assignment applications for such stations received in FAS prior to systems review shall be referred directly to the SPS.

The FAS may effect frequency assignment action for a) additional stations and b) the modification of assignments to stations in existing systems or systems approved under this procedure, provided the operations resulting from the assignment action will have only minor or local effect upon the electromagnetic environment.

The FAS shall place emphasis on the careful review of applications involving sharing of the same frequency bands by terrestrial and space services. When necessary, the FAS may recommend to IRAC that further EMC analysis by the Office of Telecommunications, Department of Commerce, or other cognizant agency, be completed prior to assignment action. Any matters that cannot be resolved, and those applications for which approval could result in major effects on the future use of the frequency band concerned, shall be referred to the IRAC.

The Technical Subcommittee (TSC)

The Technical Subcommittee and its working groups shall provide information from ongoing programs in standards, criteria for spectrum sharing, propagation, trade-offs among telecommunications techniques, radio noise and interference environments, side effects of spectrum use, and Government-wide EMC capability. In addition, the TSC shall be guided in its work, scope, and priority by requirements identified by the IRAC for support of EMC reviews underway and expected in accordance with these procedures.

The Government Agencies

Agencies will participate in the application of these procedures in the IRAC and its Subcommittees and shall provide information needed for the system review as specified in section 8.3.7. Agencies will take into account recommendations provided as a result of the system review in the modification and resubmission of proposals to improve system EMC characteristics and facilitate frequency support. Agencies may recommend and will consider modifications to existing facilities which will facilitate the accommodation of new systems.

8.3.6 EMC Analysis Support

General

In reviewing and assessing the EMC and frequency availability aspects of proposed telecommunication systems, as defined herein, the SPS shall depend upon system and equipment characteristics data submitted by the proposing agency and upon available environmental information.

The SPS shall make use of the results of any available technical studies and any pertinent EMC analysis capabilities within Government agencies when assessing proposed systems. More specifically, the SPS shall arrange for and make use of existing EMC analysis capabilities and procedures of the DOD, NASA and other Government agencies where they may expedite or enhance its assessment of a proposed system. Arrangement for such support will be obtained through the IRAC. Moreover, the SPS shall promote the cooperative exchange of views and information among the agencies that may provide EMC analysis support to the Subcommittees.

The SPS will be supported by the OT/DOC and may refer to that agency, as appropriate, through the IRAC, system proposals for evaluation and recommendations regarding:

a) compliance with prevailing standards

b) predicted degree of EMC with the environment;

c) relative efficiency in the use of the radio spectrum by the proposed system;

d) system modification or alternatives, including modifications to stations already operating in the band(s) in question where appropriate.

Types of Analysis

Various types of analysis will be required in the different pre-assignment phases. These will vary from a determination of gross impact on the spectrum to detailed EMC analysis. The level and complexity of analysis must depend on the quality of the data available at the various stages of system development.

Stage 1

In the conceptual stage where much of the system data will be estimated, only gross calculations may be achievable for a general evaluation of spectrum impact that will be subject to adjustment during later stages. However, checks will be made against existing standards and sharing criteria, comparison made with known similar systems, and an evaluation of spectrum efficiency performed. Calculations required in connection with the International Advance Publication on Space Systems will also be performed at this stage.

Stage 2

In the experimental stage, the foregoing types of analyses will be applied where appropriate with more specific EMC analysis against a typical environment being added where experimental testing of technically defined equipments is involved. Recommendations for changes to equipment characteristics and contemplated operational employment/deployment will be provided where appropriate.

Stage 3

In the pre-development phase, more detailed EMC analysis will be performed, using measured data from experimentation when available. Appropriate recommendations as to equipment characteristics and/or operational employment/deployment will be developed.

Stage 4

In the pre-procurement phase, specific and detailed EMC analysis will be performed, to include consideration of realistic frequency assignments for specific system deployment. Appropriate recommendations as to equipment characteristics and/or operational limitations will be provided.

8.3.7 Data Requirements

General

In planning telecommunication systems within the scope of this procedure, Government agencies shall provide data, as categorized below, to the SPS for review at the various stages of system development, as appropriate, and in accordance with the provisions of this part. All of the specified categories of data that are appropriate to the system under review are required for Stages 2, 3 and 4. While no specific minimums of data are specified for reviewing Stage 1, beyond the guidance provided under the various categories below, agencies shall provide sufficient data to support the level of analysis required under ITU regulations and procedures for space systems and for analysis as indicated under section 8.3.6. It may be necessary for agencies to estimate values or ranges of values for certain categories of data.

The SPS may request the submission of additional data or data estimates during the course of its system review or may endorse direct contact between the EMC analysis support agency (OT/DOC or other) and the requesting agency for development of data estimates.

Agencies proposing new systems shall be responsible for the upgrading of data provided to the SPS for the earlier stages, as more valid information becomes available and as the system progresses through the various review stages to its final operational configurations.

The SPS may request the selective upgrading of environmental data by using agencies for specific areas and radio services, where necessary to support realistic EMC analyses of new systems.

Data Categories

1. System Purpose

   Submit for all stages a summary description of the function of the system or subsystem, e.g., collect and disseminate meteorological data using satellite techniques, transmission of radar data for air traffic control, or the remote control of ATC radars.

2. Information Transfer Requirement

   Submit for all stages the required character, quantities, data rates, and circuit quality/reliability.

3. System Configuration

   a. Space Systems

      1) For Stage 1 (conceptual), submit as a minimum the

Regulations. Where available, provide planned earth station locations, modulation characteristics (earth and space stations), and additional antenna characteristics (earth and space station).

2) For Stages 2, 3 and 4, submit information specified in Appendix 1A to the ITU Radio Regulations, including those items identified with footnote 1.

3) For all stages, submit line diagram(s) showing the links, direction of transmission, and frequency band(s)

b. Terrestrial Systems

For all stages, submit:

1) station class(es);

2) number of units (for mobile systems);

3) station locations and/or area of operation, as appropriate (geographical coordinates required for Stages 2, 3 and 4);

4) frequency requirements; i.e., band(s) or discrete frequencies required, bandwidth and emission designators, netting information, where appropriate;

5) proposed date of activation; and

6) line diagram(s) showing the links, direction of transmission, and frequency band(s).

4. Estimated Termination Date (where applicable)

5. Estimated Initial Cost of the System

This item is for information to show the general size and complexity of the system. It is not intended to be a determining factor in EMC review.

6. Target Dates

Submit dates on which spectrum related decisions must be made relative to system planning, development, procurement, and employment.

7. System Justification

Submit for all stages, a statement of the relationship between the proposed system and the activity it is

intended to support. Include a brief statement of the essentiality of the supported activity.

8. Replacement Information

Identify the existing system(s) and associated frequency assignments to be replaced by the proposed system, where applicable.

9. Equipment Characteristics

Submit the following categories of data applicable to all equipments intended for use in systems under review. Data on earth and space station equipment provided under item 3.a.2) need not be repeated. All applicable data items shall be submitted for Stages 2, 3 and 4 (estimated values or ranges of values may be submitted for Stage 2 in the absence of other available data). For the Stage 1, actual equipment data, or in the absence of such data, estimated data and ranges of values shall be provided in sufficient quantity to support a realistic preliminary assessment of frequency availability and EMC characteristics.

a. Transmitters

1) Nomenclature - If applicable, enter Government or commercial nomenclature.

2) Manufacturer - Enter the name of the manufacturer, developer, or the sole distributor. This is optional if a Government nomenclature is provided and mandatory if a commercial nomenclature is provided.

3) Type - Enter the generic name, e.g., track-while-scan radar transmitter, land mobile base station transmitter.

4) Frequency tuning range(s) - Enter the tuning limitations (increments) if noncontinuous.

5) Frequency tolerance - Enter in PPM.

6) Power output - Enter per section 9.8.4.

7) Emission Designator(s) - Enter per section 6.3.1.

8) Baseband bandwidth (for FM transmitters) - Enter the maximum value of contemplated use.

9) Deviation ratio (for FM transmitters) - Enter the maximum value of contemplated use.

10) Pulse characteristics - Enter the following data where applicable. Pulse duration (μ secs. at 1/2 voltage

points); rise time (μ secs, between 10% and 90% voltage amplitude points) decay time (same as rise time); pulse repetition rate(s) in PPS; and pulse compression ratio.

11) Other modulation information - Enter, e.g., number of multiplexed channels, etc.

12) Emission fall-off-data - Enter emission bandwidth values for the minus 3, 20, and 60 dB levels.

13) Harmonic levels (dB of attenuation) - Enter levels through the 6th harmonic or 22 GHz, whichever is lower.

14) Spurious levels (dB of attenuation) - Enter significant emission levels outside the minus 60 dB bandwidths.

15) Special circuitry - Where applicable enter significant special characteristics, e.g., filters, synthesizer, wave-guide-cut-off, etc.

16) Output tube or solid state type - Enter the generic type, e.g., triode, TWT, klystron, parallel bipolar, varactor multiplier.

17) Associated system(s) nomenclature if applicable - Enter AN nomenclature or equivalent covering transmitter/receiver/antenna combinations.

b. Receivers

1) Nomenclature - If applicable, enter Government or commercial nomenclature.

2) Manufacturer - Enter the name of the manufacturer, developer, or the sole distributor. This is optional if a Government nomenclature is provided and mandatory if a commercial nomenclature is provided.

3) Type - Enter the generic name, e.g., dual conversion superheterodyne, etc.

4) Frequency tuning range(s) - Enter the tuning limitations (increments) if noncontinuous.

5) Emission designator(s) - Enter per section 6.3.1.

6) Sensitivity - Enter in dBm for terrestrial, noise temperature for space and earth station receivers.

7) Image rejection - Enter the number of dB down.

8) RF selectivity data - Enter off-tune frequency separation values for minus 3, 20, and 60 dB levels.

9) Spurious response rejection (dB down) - Enter a value(s) applicable to signals outside frequency separation parameters entered for 8) above.

10) 1st IF frequency - Enter the nominal frequency.

11) Local oscillator tuning position - Enter whether the oscillator is above or below RF carrier.

12) Overall IF selectivity - Enter off-tune frequency separation values for minus 3, 20 and 60 dB levels.

13) Other RF/IF information - Enter as applicable.

14) Baseband bandwidth - Enter for FM.

15) Other modulation information - Enter, e.g., multiplexed channel capacity, etc.

16) Special circuitry - Where applicable, enter significant special characteristics, e.g., integrators, correlators, etc.

17) Associated system(s) nomenclature if applicable - Enter AN nomenclature or equivalent covering transmitter/ receiver/antenna combination.

c. Antennas

1) Nomenclature - If applicable, enter Government or commercial nomenclature.

2) Manufacturer - Enter the name of the manufacturer, developer, or the sole distributor. This is optional if a Government nomenclature is provided and is mandatory if a commercial nomenclature is provided.

3) Antenna type - Enter generic name.

4) Frequency range - Enter design range.

5) Fundamental gain - Enter in dB above isotropic.

6) Horizontal and vertical beamwidths - Enter in degrees at the -3 dB power points.

7) Antenna physical characteristics (optional) - Enter significant dimensions and features, e.g., reflector dimensions, types of feed, etc.

8) Polarization - Enter type of polarization, e.g., circular (left or right hand), vertical, horizontal.

9) Antenna scan characteristics - Where applicable, enter scan rate.

10) Other pattern data (optional) - Provide polar diagrams maximum side-lobe levels, back-lobe levels, etc., unless previously submitted under item 3.a.

11) Associated system(s) nomenclature - If applicable enter AN nomenclature or equivalent covering transmitter/receiver/antenna combinations.

10. Related Analysis Data

For all stages, submit reports of any previous EMC studies, predictions, or analyses that are relevant to the assessment of the system under review.